The importance of fat in the physical and sensory aspects of the ice cream is widely recognized today. The formation of the fat network contributes to the air stabilization, texture characteristics and melting resistance in ice creams. Palm fat has been used as a fat substitute to the hydrogenated fat in several food products, since it is free of trans fatty acids. This work aimed to study the fat network formation of ice creams produced with palm fat. Two ice cream formulations were produced using the same methodology and ratio of ingredients where one used hydrogenated vegetable fat and the other, palm fat. Firmness was measured through back-extrusion at the TA-XT2 (Stable Micro System) texturometer, and the overrun was calculated. A melting curve was obtained by recording the weight of the dripped portion of 100 g of the ice cream samples placed on a metal grid, every 5 minutes for 45 minutes at 25 °C. The fat content of the dripped portion and the ice cream on the metal grid at the end of the melting test was analyzed. The ice cream with palm fat showed a higher firmness, lower overrun and a higher melting rate than the ice cream with hydrogenated fat. It also had a higher concentration of fat in the dripped portion when compared with the hydrogenated fat ice cream. It is suggested that formulations produced with palm fat suffer a poorer partial coalescence by its crystallization profile and less membrane destabilization by the emulsifiers.